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LAKE VERMILION, VERMILION COUNTY, ILLINOIS

Pacific Northwest Environmental Research Laboratory

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June 1975

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16. ABSTRACT
Annual, total phosphorus and total nitrogen loadings to the lake were estimated and subdivided according to either point or non-point source origin. An assessment of the lake's trophic condition and limiting nutrient is also provided. All data collected by the U.S.E.P.A. National Eutrophication Survey during the one year study of the lake and its tributaries are included in the report.

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NATIONAL EUTROPHICATION SURVEY

48 pp

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REPORT
ON
LAKE VERMILION
VERMILION COUNTY
ILLINOIS
EPA REGION V
WORKING PAPER No. 320

WITH THE COOPERATION OF THE
ILLINOIS ENVIRONMENTAL PROTECTION AGENCY
AND THE
ILLINOIS NATIONAL GUARD
JUNE, 1975

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FOREWORD

The National Eutrophication Survey was initiated in 1972 in response to an Administration commitment to investigate the nationwide threat of accelerated eutrophication to fresh water lakes and reservoirs.

OBJECTIVES

The Survey was designed to develop, in conjunction with state environmental agencies, information on nutrient sources, concentrations, and impact on selected freshwater lakes as a basis for formulating comprehensive and coordinated national, regional, and state management practices relating to point-source discharge reduction and non-point source pollution abatement in lake watersheds.

ANALYTIC APPROACH

The mathematical and statistical procedures selected for the Survey's eutrophication analysis are based on related concepts that:

a. A generalized representation or model relating sources, concentrations, and impacts can be constructed.

b. By applying measurements of relevant parameters associated with lake degradation, the generalized model can be transformed into an operational representation of a lake, its drainage basin, and related nutrients.

c. With such a transformation, an assessment of the potential for eutrophication control can be made.

LAKE ANALYSIS

In this report, the first stage of evaluation of lake and watershed data collected from the study lake and its drainage basin is documented. The report is formatted to provide state environmental agencies with specific information for basin planning [§303(e)], water quality criteria/standards review [§303(c)], clean lakes [§314(a,b)], and water quality monitoring [§106 and §305(b)] activities mandated by the Federal Water Pollution Control Act Amendments of 1972.

Beyond the single lake analysis, broader based correlations between nutrient concentrations (and loading) and trophic condition are being made to advance the rationale and data base for refinement of nutrient water quality criteria for the Nation's fresh water lakes. Likewise, multivariate evaluations for the relationships between land use, nutrient export, and trophic condition, by lake class or use, are being developed to assist in the formulation of planning guidelines and policies by EPA and to augment plans implementation by the states.

ACKNOWLEDGMENT

The staff of the National Eutrophication Survey (Office of Research & Development, U. S. Environmental Protection Agency) expresses sincere appreciation to the Illinois Environmental Protection Agency for professional involvement and to the Illinois National Guard for conducting the tributary sampling phase of the Survey.

Dr. Richard H. Briceland, Director of the Illinois Environmental Protection Agency; and Ronald M. Barganz, State Survey Coordinator, and John J. Forneris, Manager of Region III, Field Operations Section of the Division of Water Pollution Control, provided invaluable lake documentation and counsel during the Survey, reviewed the preliminary reports, and provided critiques most useful in the preparation of this Working Paper series.

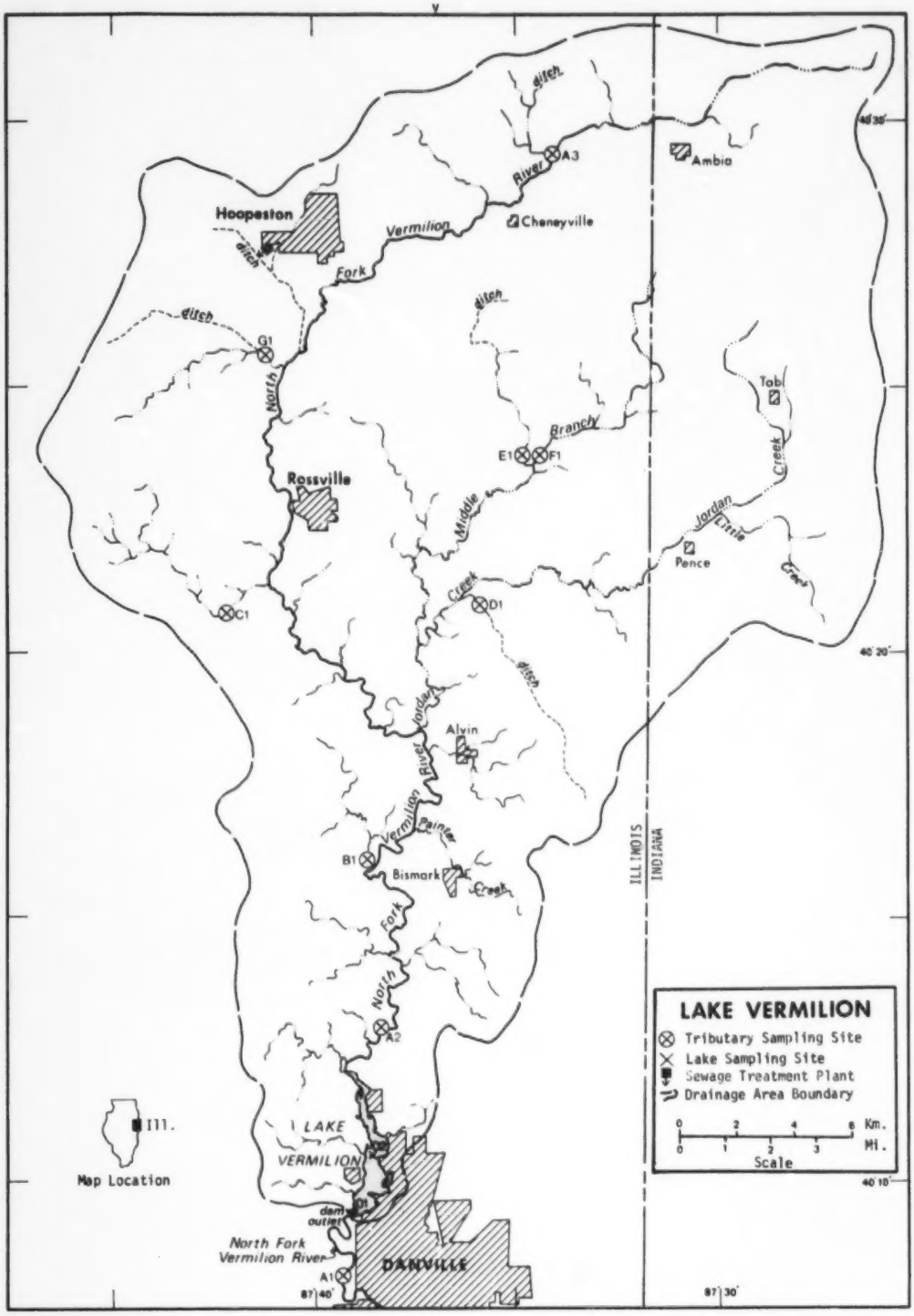
Major General Harold R. Patton, the Adjutant General of Illinois, and Project Officer Colonel Daniel L. Fane, who directed the volunteer efforts of the Illinois National Guardsmen, are also gratefully acknowledged for their assistance to the Survey.

NATIONAL EUTROPHICATION SURVEY

STUDY LAKES

STATE OF ILLINOIS

LAKE NAME	COUNTY
Baldwin	Randolph
Bloomington	McLean
Carlyle	Bond, Clinton, Fayette
Cedar	Lake
Charleston	Coles
Coffeen	Montgomery
Crab Orchard	Jackson, Williamson
Decatur	Macon
DePue	Bureau
East Loon	Lake
Fox	Lake
Grass	Lake
Highland Silver	Madison
Holiday	LaSalle
Horseshoe	Madison
Long	Lake
Lou Yaeger	Montgomery
Marie	Lake
Old Ben Mine	Franklin
Pistakee	Lake, McHenry
Raccoon	Marion
Rend	Franklin, Jefferson
Sangchris	Christian
Shelbyville	Moultrie, Shelby
Slocum	Lake
Springfield	Sangamon
Storey	Knox
Vandalia	Fayette
Vermilion	Vermilion
Wee-Ma-Tuk	Fulton
Wonder	McHenry


ditch
A3
Ambia
Hoopeston
Vermilion
Cheneyville
Fork
ditch
ditch
G1
North
Branch
E1
F1
Rossville
Middle
Fork
Creek
Jordan
Creek
Pence
C1
D1
ditch
Alvin
Vermilion River
Jordan
Creek
B1
Bismark
Creek
North Fork
A2
ILLINOIS
INDIANA
Ill.
Map Location
LAKE
VERMILION
dam
outlet
North Fork
Vermilion River
A1
DANVILLE
87°40'
87°30'
40°35'
40°20'
40°10'
LAKE VERMILION
Tributary Sampling Site
Lake Sampling Site
Sewage Treatment Plant
Drainage Area Boundary
0 2 4 6 Km.
0 1 2 3 Mi.
Scale

LAKE VERMILION

STORET NO. 1748

I. CONCLUSIONS

A. Trophic Condition:

Survey data show that Lake Vermilion is eutrophic. It ranked 24th in overall trophic quality when the 31 Illinois lakes sampled in 1973 were compared using an index of six parameters*. Fifteen of the lakes had less median total phosphorus, 16 had less median dissolved phosphorus, 29 had less median inorganic nitrogen, 17 had less mean chlorophyll a, and 16 had greater mean Secchi disc transparency. Marked depression of dissolved oxygen with depth occurred at sampling station 1 in August.

Survey limnologists noted moderate turbidity (1% light penetration ranged from 0.4-1.5 m) during all sampling periods, and emergent vegetation was observed in the shallow areas near station 2.

B. Rate-Limiting Nutrient:

A significant loss of phosphorus occurred in the assay sample from the time of collection to the beginning of the assay, and the results are not indicative of conditions in the lake at the time the sample was taken (05/11/73).

---

* See Appendix A.

However, the mean concentration of orthophosphorus in the lake at that time indicates a probable high level of potential primary productivity.

The lake data indicate phosphorus limitation at all sampling times.

C. Nutrient Controllability:

1. Point sources--The estimated phosphorus contribution of known point sources, including septic tanks, amounted to 31.2% of the total load to Lake Vermilion during the sampling year. The City of Hoopeston contributed 30.5%, and Rossville septic tanks contributed 0.7% of the total.

The present phosphorus loading rate of 10.20 $g/m^2/yr$ is seven times that proposed by Vollenwider (Vollenweider and Dillon, 1974) as a eutrophic rate (see page 14). However, the mean hydraulic retention time of Lake Vermilion is a short nine days, and Vollenweider's model probably is not applicable. Nonetheless, the trophic condition of the lake is evidence of excessive nutrient loads, and all phosphorus inputs should be minimized to the greatest practicable extent.

2. Non-point sources--The North Fork, Vermilion River was estimated to have contributed 62.4% of the total phosphorus load reaching Lake Vermilion during the sampling year. The ungaged drainage area was estimated to have contributed 6.3% of the total.

The phosphorus export rate of the North Fork, Vermilion River compares well with the rates of five tributaries of nearby Lake Decatur* (mean of 35 kg/km^2/yr; range of 31 to 41 kg/km^2/yr) but was somewhat higher than most of the tributaries sampled for land-use studies (see page 13).

* Working Paper No. 302.

II. LAKE AND DRAINAGE BASIN CHARACTERISTICS†

A. Lake Morphometry††:

1. Surface area: 2.83 kilometers^2.
2. Mean depth: 1.4 meters.
3. Maximum depth: >4.6 meters.
4. Volume: 3.962 x 10^6 m^3.
5. Mean hydraulic retention time: 9 days.

B. Tributary and Outlet:
(See Appendix C for flow data)

1. Tributaries -

Name	Drainage area (km^2)*	Mean flow (m^3/sec)*
N. Fork, Vermilion River	730.4	4.8
Minor tributaries & immediate drainage -	41.2	0.3
Totals	771.6	5.1

2. Outlet -

N. Fork, Vermilion River	774.4**	5.1

C. Precipitation***:

1. Year of sampling: 120.8 centimeters.
2. Mean annual: 95.1 centimeters.

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† Table of metric conversions--Appendix B.
†† Forneris, 1973.
* For limits of accuracy, see Working Paper No. 175.
** Includes area of lake.
*** See Working Paper No. 175.

III. LAKE WATER QUALITY SUMMARY

Lake Vermilion was sampled three times during the open-water season of 1973 by means of a pontoon-equipped Huey helicopter. Each time, samples for physical and chemical parameters were collected from two stations on the lake and from one or more depths at each station (see map, page v). During each visit, a single depth-integrated (near bottom to surface) sample was composited from the two stations for phytoplankton identification and enumeration; and during the first visit, a single 18.9-liter depth-integrated sample was composited for algal assays. Also each time, a depth-integrated sample was collected from each of the stations for chlorophyll a analysis. The maximum depths sampled were 4.6 meters at station 1 and 0.9 meters at station 2.

The results obtained are presented in full in Appendix D and are summarized in the following table.

A. SUMMARY OF PHYSICAL AND CHEMICAL CHARACTERISTICS FOR VERMILION LAKE
STORET CODE 1748

PARAMETER	1ST SAMPLING (5/11/73) 2 SITES RANGE	MEAN	MEDIAN	2ND SAMPLING (8/ 8/73) 2 SITES RANGE	MEAN	MEDIAN	3RD SAMPLING (10/17/73) 2 SITES RANGE	MEAN	MEDIAN
TEMP (C)	16.6 - 17.8	17.3	17.4	23.4 - 25.3	24.6	25.0	17.8 - 18.6	18.3	18.4
DISS OXY (MG/L)	8.0 - 9.7	8.7	8.6	0.8 - 8.8	5.4	6.5	5.8 - 6.0	5.9	5.9
CNDCTVY (MCROMO)	600. - 650.	623.	625.	524. - 533.	528.	526.	460. - 475.	464.	461.
PH (STAND UNITS)	8.1 - 8.3	8.2	8.2	7.6 - 8.3	8.0	8.1	8.0 - 8.2	8.1	8.0
TOT ALK (MG/L)	200. - 220.	214.	220.	197. - 235.	216.	217.	210. - 238.	222.	218.
TOT P (MG/L)	0.068 - 0.123	0.094	0.097	0.069 - 0.222	0.130	0.114	0.111 - 0.121	0.117	0.120
ORTHO P (MG/L)	0.040 - 0.066	0.054	0.054	0.008 - 0.064	0.031	0.026	0.047 - 0.060	0.055	0.057
NO2+NO3 (MG/L)	7.250 - 7.680	7.542	7.620	4.040 - 4.620	4.485	4.520	1.110 - 1.380	1.203	1.120
AMMONIA (MG/L)	0.030 - 0.110	0.068	0.070	0.090 - 0.120	0.103	0.105	0.050 - 0.140	0.093	0.090
KJEL N (MG/L)	0.400 - 0.800	0.520	0.500	1.000 - 1.900	1.450	1.450	0.500 - 1.400	0.833	0.600
INORG N (MG/L)	7.280 - 7.750	7.610	7.730	4.140 - 4.730	4.530	4.625	1.160 - 1.520	1.297	1.210
TOTAL N (MG/L)	7.650 - 8.420	8.062	8.060	5.620 - 6.300	5.875	5.790	1.610 - 2.780	2.037	1.720
CHLRPYL A (UG/L)	5.3 - 12.6	8.9	8.9	18.7 - 96.3	57.5	57.5	18.8 - 35.2	27.0	27.0
SECCHI (METERS)	0.4 - 0.8	0.6	0.6	0.2 - 0.7	0.4	0.4	0.3 - 0.5	0.4	0.4

B. Biological characteristics:

1. Phytoplankton -

Sampling Date	Dominant Genera	Algal units per ml
05/11/73	1. Melosira sp.	534
	2. Synedra sp.	276
	3. Flagellates	129
	4. Cryptomonas sp.	110
	5. Euglena sp.	55
	Other genera	258
	Total	1,362
08/08/73	1. Cyclotella sp.	776
	2. Merismopedia sp.	388
	3. Blue-green filaments	259
	4. Flagellates	216
	5. Cryptomonas sp.	216
	Other genera	559
	Total	2,414
10/17/73	1. Stephanodiscus sp.	8,643
	2. Euglena sp.	1,493
	3. Chlamydomonas sp.	1,257
	4. Cryptomonas sp.	1,110
	5. Crucigenia sp.	1,021
	Other genera	5,096
	Total	18,620

2. Chlorophyll *a* -

Sampling Date	Station Number	Chlorophyll *a* (µg/l)
05/11/73	01	5.3
	02	12.6
08/08/73	01	18.7
	02	96.3
10/17/73	01	18.8
	02	35.2

C. Limiting Nutrient Study:

An 80% loss of orthophosphorus occurred in the assay sample from the time of collection to the beginning of the assay, and the results are not indicative of lake conditions at the time the sample was collected (05/11/73). However, the mean concentration of phosphorus in the lake at the time of collection (0.054 mg/l) indicates a probable high level of potential primary productivity.

The lake data indicate phosphorus limitation at all sampling times; the mean inorganic nitrogen/orthophosphorus ratios were 24/1 or greater, and phosphorus limitation would be expected.

IV. NUTRIENT LOADINGS
(See Appendix E for data)

For the determination of nutrient loadings, the Illinois National Guard collected monthly near-surface grab samples from each of the tributary sites indicated on the map (page v), except for the high runoff months of February and March when two samples were collected. Sampling was begun in June, 1973, and was completed in May, 1974.

Through an interagency agreement, stream flow estimates for the year of sampling and a "normalized" or average year were provided by the Illinois District Office of the U.S. Geological Survey for the tributary sites nearest the lake.

In this report, nutrient loads for sampled tributaries were determined by using a modification of a U.S. Geological Survey computer program for calculating stream loadings*. Nutrient loads shown are those measured minus point-source loads.

Nutrient loads for unsampled "minor tributaries and immediate drainage" ("ZZ" of U.S.G.S.) were estimated by using the means of the nutrient loads, in $kg/km^2/year$, at stations B-1, C-1, D-1, E-1, F-1, and G-1 (see page 13) and multiplying the means by the ZZ area in km^2.

The City of Hoopeston did not participate in the Survey, and nutrient loads were estimated at 1.134 kg P and 3.401 kg N/capita/year. The Village of Rossville has no municipal system and is served by septic tanks.

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* See Working Paper No. 175.

A. Waste Sources*:

1. Known municipal -

Name	Pop. Served	Treatment	Mean Flow (m^3/d)	Receiving Water
Hoopeston	7,500	trickling filter	2,838.8**	Hoopeston Creek
Rossville	1,700	septic tanks	643.4**	N. Fork, Vermilion R.

2. Known industrial - None

* Barganz, 1975.
** Estimated at 0.3785 m^3/capita/day.

B. Annual Total Phosphorus Loading - Average Year:

1. Inputs -

Source	kg P/ yr	% of total
a. Tributaries (non-point load) -		
N. Fork, Vermilion River	18,010	62.4
b. Minor tributaries & immediate drainage (non-point load) -	1,820	6.3
c. Known municipal -		
Hoopeston	8,805	30.5
d. Septic tanks (Rossville)* -	195	0.7
e. Known industrial - None	-	-
f. Direct precipitation* -	50	0.1
Total	28,880	100.0

2. Outputs -

Lake outlet - N. Fork, Vermilion River	19,430

3. Net annual P accumulation - 9,450 kg.

* See Working Paper No. 175.

C. Annual Total Nitrogen Loading - Average Year:

1. Inputs -

Source	kg N/ yr	% of total
a. Tributaries (non-point load) -		
N. Fork, Vermilion River	994,045	90.5
b. Minor tributaries & immediate drainage (non-point load) -	68,250	6.2
c. Known municipal -		
Hoopeston	25,510	2.3
d. Septic tanks (Rossville)* -	7,245	0.7
e. Known industrial - None	-	-
f. Direct precipitation* -	3,055	0.3
Total	1,098,105	100.0

2. Outputs -

Lake outlet - N. Fork, Vermilion River	1,020,830

3. Net annual N accumulation - 77,275 kg.

* See Working Paper No. 175.

D. Mean Annual Non-point Nutrient Export by Subdrainage Area:

Tributary	kg P/km²/yr	kg N/km²/yr
N. Fork, Vermilion River	25	1,361
Unnamed Creek (B-1)*	18	1,610
Unnamed Creek (C-1)*	16	1,549
Unnamed Creek (D-1)*	109	1,949
Unnamed Creek (E-1)*	93	1,771
Middle Branch (F-1)*	15	1,612
Unnamed Creek (G-1)*	14	1,448

* These tributaries were sampled for land-use studies and are presented here for comparison. The nutrient exports of these streams are included in the N. Fork, Vermilion River exports at station A-2.

E. Yearly Loading Rates:

In the following table, the existing phosphorus loading rates are compared to those proposed by Vollenweider (Vollenweider and Dillon, 1974). Essentially, his "dangerous" rate is the rate at which the receiving water would become eutrophic or remain eutrophic; his "permissible" rate is that which would result in the receiving water remaining oligotrophic or becoming oligotrophic if morphometry permitted. A mesotrophic rate would be considered one between "dangerous" and "permissible".

Note that Vollenweider's model may not be applicable to water bodies with short hydraulic retention times.

	Total Phosphorus		Total Nitrogen	
	Total	Accumulated	Total	Accumulated
grams/m^2/yr	10.20	3.34	388.0	27.3

Vollenweider loading rates for phosphorus ($g/m^2/yr$) based on mean depth and mean hydraulic retention time of Lake Vermilion:

"Dangerous" (eutrophic rate)	1.44
"Permissible" (oligotrophic rate)	0.72

V. LITERATURE REVIEWED

Barganz, Ronald M., 1975. Personal communication (point sources impacting Lake Vermilion). IL Env. Prot. Agency, Springfield.

Forneris, John J., 1973. Personal communication (lake morphometry). IL Env. Prot. Agency, Springfield.

Vollenweider, R. A., and P. J. Dillon, 1974. The application of the phosphorus loading concept to eutrophication research. Natl. Res. Council of Canada Publ. No. 13690, Canada Centre for Inland Waters, Burlington, Ontario.

VI. APPENDICES

APPENDIX A

LAKE RANKINGS

LAKE DATA TO BE USED IN RANKINGS

LAKE CODE	LAKE NAME	MEDIAN TOTAL P	MEDIAN INORG N	500-MEAN SEC	MEAN CHLORA	15-MIN DO	MEDIAN DISS ORTHO P
1703	LAKE BLOOMINGTON	0.050	5.730	464.667	26.200	14.800	0.020
1706	LAKE CARLYLE	0.084	1.270	477.889	17.367	11.000	0.032
1708	LAKE CHARLESTON	0.160	4.680	490.667	12.000	8.400	0.065
1711	COFFEEN LAKE	0.032	0.260	456.222	7.700	14.900	0.012
1712	CRAB ORCHARD LAKE	0.082	0.200	482.222	59.867	13.800	0.013
1714	LAKE DECATUR	0.129	3.750	479.571	43.000	14.500	0.062
1725	LONG LAKE	0.704	1.190	482.667	49.333	8.800	0.398
1726	LAKE LOU YAEGER	0.186	1.600	489.583	10.662	11.400	0.076
1727	LAKE MARIE	0.098	0.370	467.667	39.533	14.700	0.057
1733	PISTAKEE LAKE	0.203	0.370	485.667	75.867	7.000	0.062
1735	REND LAKE	0.071	0.210	471.500	23.533	12.700	0.012
1739	LAKE SHELBYVILLE	0.062	3.290	461.333	17.161	14.800	0.019
1740	SILVER LAKE (HIGHLAND)	0.226	0.970	489.500	5.822	14.800	0.057
1742	LAKE SPRINGFIELD	0.108	3.265	483.385	13.013	10.800	0.059
1748	VERMILION LAKE	0.109	4.695	481.500	31.150	14.200	0.050
1750	WONDER LAKE	0.426	0.890	486.000	98.533	7.800	0.132
1751	LAKE STORY	0.072	2.510	459.333	17.250	14.800	0.021
1752	DEPUE LAKE	0.438	4.050	490.000	58.833	7.600	0.276
1753	LAKE SANGCHRIS	0.050	1.970	475.417	19.292	14.500	0.009
1754	LAKE HOLIDAY	0.167	3.135	485.167	51.217	7.200	0.046
1755	FOX LAKE	0.219	0.375	486.167	63.850	8.800	0.083
1756	GRASS LAKE	0.301	0.820	481.000	83.500	5.900	0.093
1757	EAST LOON LAKE	0.076	0.120	450.000	22.300	14.900	0.018
1758	SLOCUM LAKE	0.865	0.200	487.333	221.100	5.800	0.362
1759	CEDAR LAKE	0.029	0.170	400.333	5.767	12.800	0.013
1761	LAKE WEMATUK	0.069	1.770	466.333	7.967	14.500	0.031
1762	RACCOON LAKE	0.106	0.310	484.333	19.217	13.800	0.020
1763	BALDWIN LAKE	0.044	0.140	461.167	11.333	13.200	0.007

LAKE DATA TO BE USED IN RANKINGS

LAKE CODE	LAKE NAME	MEDIAN TOTAL P	MEDIAN INORG N	500-MEAN SEC	MEAN CHLORA	15-MIN DO	MEDIAN DISS ORTHO P
1764	LAKE VANDALIA	0.116	0.480	478.111	11.276	14.800	0.023
1765	OLD BEN MINE RESERVOIR	0.930	0.205	478.333	31.433	11.200	0.575
1766	HORSESHOE LAKE	0.127	0.705	482.833	182.250	6.800	0.018

PERCENT OF LAKES WITH HIGHER VALUES (NUMBER OF LAKES WITH HIGHER VALUES)

LAKE CODE	LAKE NAME	MEDIAN TOTAL P	MEDIAN INORG N	500-MEAN SEC	MEAN CHLORA	15-MIN DO	MEDIAN DISS ORTHO P	INDEX NO
1703	LAKE BLOOMINGTON	88 (26)	0 (0)	80 (24)	47 (14)	13 (2)	68 (20)	296
1706	LAKE CARLYLE	63 (19)	40 (12)	63 (19)	63 (19)	63 (19)	53 (16)	345
1708	LAKE CHARLESTON	37 (11)	7 (2)	0 (0)	77 (23)	77 (23)	27 (8)	225
1711	COFFEEN LAKE	97 (29)	77 (23)	93 (28)	93 (28)	2 (0)	92 (27)	454
1712	CRAB ORCHARD LAKE	67 (20)	90 (27)	43 (13)	20 (6)	42 (12)	85 (25)	347
1714	LAKE DECATUR	40 (12)	13 (4)	53 (16)	33 (10)	30 (8)	32 (9)	201
1725	LONG LAKE	7 (2)	43 (13)	40 (12)	30 (9)	72 (21)	3 (1)	195
1726	LAKE LOU YAEGER	30 (9)	37 (11)	7 (2)	87 (26)	57 (17)	23 (7)	241
1727	LAKE MARIE	60 (18)	68 (20)	73 (22)	37 (11)	23 (7)	42 (12)	303
1733	PISTAKEE LAKE	27 (8)	68 (20)	23 (7)	13 (4)	90 (27)	32 (9)	253
1735	REND LAKE	77 (23)	80 (24)	70 (21)	50 (15)	53 (16)	92 (27)	422
1739	LAKE SHELBYVILLE	83 (25)	17 (5)	83 (25)	70 (21)	13 (2)	73 (22)	339
1740	SILVER LAKE (HIGHLAND)	20 (6)	47 (14)	10 (3)	97 (29)	13 (2)	42 (12)	229
1742	LAKE SPRINGFIELD	53 (16)	20 (6)	33 (10)	73 (22)	67 (20)	37 (11)	283
1748	VERMILION LAKE	50 (15)	3 (1)	47 (14)	43 (13)	37 (11)	47 (14)	227
1750	WONDER LAKE	13 (4)	50 (15)	20 (6)	7 (2)	80 (24)	13 (4)	183
1751	LAKE STORY	73 (22)	27 (8)	90 (27)	67 (20)	13 (2)	63 (19)	333
1752	DEPUE LAKE	10 (3)	10 (3)	3 (1)	23 (7)	83 (25)	10 (3)	139
1753	LAKE SANGCHRIS	88 (26)	30 (9)	67 (20)	57 (17)	30 (8)	97 (29)	369
1754	LAKE HOLIDAY	33 (10)	23 (7)	27 (8)	27 (8)	87 (26)	50 (15)	247
1755	FOX LAKE	23 (7)	63 (19)	17 (5)	17 (5)	72 (21)	20 (6)	212
1756	GRASS LAKE	17 (5)	53 (16)	50 (15)	10 (3)	97 (29)	17 (5)	244
1757	EAST LOON LAKE	70 (21)	100 (30)	97 (29)	53 (16)	2 (0)	77 (23)	399
1758	SLOCUM LAKE	3 (1)	87 (26)	13 (4)	0 (0)	100 (30)	7 (2)	210
1759	CEDAR LAKE	100 (30)	93 (28)	100 (30)	100 (30)	50 (15)	85 (25)	528
1761	LAKE WEMATUK	80 (24)	33 (10)	77 (23)	90 (27)	30 (8)	57 (17)	367
1762	RACCOON LAKE	57 (17)	73 (22)	30 (9)	60 (18)	42 (12)	68 (20)	330
1763	BALDWIN LAKE	93 (28)	97 (29)	87 (26)	80 (24)	47 (14)	100 (30)	504

PERCENT OF LAKES WITH HIGHER VALUES (NUMBER OF LAKES WITH HIGHER VALUES)

LAKE CODE	LAKE NAME	MEDIAN TOTAL P	MEDIAN INORG N	500-MEAN SEC	MEAN CHLORA	15-MIN DO	MEDIAN DISS ORTHO P	INDEX NO
1764	LAKE VANDALIA	47 (14)	60 (18)	60 (18)	83 (25)	13 (2)	60 (18)	323
1765	OLD BEN MINE RESERVOIR	0 (0)	83 (25)	57 (17)	40 (12)	60 (18)	0 (0)	240
1766	HORSESHOE LAKE	43 (13)	57 (17)	37 (11)	3 (1)	93 (28)	80 (24)	313

LAKES RANKED BY INDEX NOS.

RANK	LAKE CODE	LAKE NAME	INDEX NO
1	1759	CEDAR LAKE	528
2	1763	BALDWIN LAKE	504
3	1711	COFFEEN LAKE	454
4	1735	RENO LAKE	422
5	1757	EAST LOON LAKE	399
6	1753	LAKE SANGCHRIS	369
7	1761	LAKE WENATUK	367
8	1712	CRAB ORCHARD LAKE	347
9	1706	LAKE CARLYLE	345
10	1739	LAKE SHELBYVILLE	339
11	1751	LAKE STORY	333
12	1762	RACCOON LAKE	330
13	1764	LAKE VANDALIA	323
14	1766	HORSESHOE LAKE	313
15	1727	LAKE MARIE	303
16	1703	LAKE BLOOMINGTON	296
17	1742	LAKE SPRINGFIELD	283
18	1733	PISTAKEE LAKE	253
19	1754	LAKE HOLIDAY	247
20	1756	GRASS LAKE	244
21	1726	LAKE LOU YAEGER	241
22	1765	OLD BEN MINE RESERVOIR	240
23	1740	SILVER LAKE (HIGHLAND)	229
24	1748	VERMILION LAKE	227
25	1708	LAKE CHARLESTON	225
26	1755	FOX LAKE	212
27	1758	SLOCUM LAKE	210
28	1714	LAKE DECATUR	201

LAKES RANKED BY INDEX NOS.

RANK	LAKE CODE	LAKE NAME	INDEX NO
29	1725	LONG LAKE	195
30	1750	WONDER LAKE	183
31	1752	DEPUE LAKE	139

APPENDIX B

CONVERSIONS FACTORS

CONVERSION FACTORS

Hectares x 2.471 = acres

Kilometers x 0.621 = miles

Meters x 3.281 = feet

Cubic meters x 8.107×10^{-4} = acre/feet

Square kilometers x 0.3861 = square miles

Cubic meters/sec x 35.315 = cubic feet/sec

Centimeters x 0.3937 = inches

Kilograms x 2.205 = pounds

Kilograms/square kilometer x 5.711 = lbs/square mile

APPENDIX C

TRIBUTARY FLOW DATA

TRIBUTARY FLOW INFORMATION FOR ILLINOIS 10/23/75

LAKE CODE 1748 LAKE VERMILION

TOTAL DRAINAGE AREA OF LAKE(SQ KM) 771.8

TRIBUTARY	SUB-DRAINAGE AREA(SQ KM)	NORMALIZED FLOWS(CMS) JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	MEAN
1748A1	771.8	5.38	7.48	9.60	9.94	7.84	6.37	3.99	2.12	1.58	1.85	2.54	2.94	5.12
1748A2	730.4	5.07	7.05	9.03	9.37	7.39	6.00	3.68	1.99	1.48	1.73	2.38	2.77	4.81
1748A3	101.0	0.65	0.98	1.21	1.25	0.98	0.82	0.50	0.26	0.18	0.20	0.29	0.34	0.63
1748B1	14.3	0.08	0.14	0.17	0.17	0.13	0.12	0.07	0.03	0.02	0.02	0.05	0.04	0.09
1748C1	25.2	0.15	0.25	0.30	0.30	0.24	0.21	0.12	0.06	0.04	0.04	0.07	0.08	0.15
1748D1	22.9	0.14	0.22	0.27	0.28	0.22	0.19	0.11	0.06	0.03	0.04	0.06	0.07	0.14
1748E1	29.8	0.18	0.29	0.35	0.36	0.29	0.24	0.14	0.07	0.05	0.05	0.08	0.10	0.18
1748F1	47.7	0.29	0.32	0.56	0.58	0.45	0.39	0.23	0.12	0.08	0.08	0.13	0.16	0.28
1728G1	35.0	0.22	0.34	0.41	0.42	0.33	0.29	0.17	0.09	0.06	0.06	0.09	0.11	0.21
1748ZZ	44.0	0.31	0.42	0.57	0.57	0.45	0.37	0.31	0.12	0.10	0.11	0.15	0.17	0.30

SUMMARY

TOTAL DRAINAGE AREA OF LAKE = 771.8
SUM OF SUB-DRAINAGE AREAS = 1050.3

TOTAL FLOW IN = 82.06
TOTAL FLOW OUT = 61.63

NOTE *** TRIBS A3 THRU G1 ARE INCLUDED IN A2

MEAN MONTHLY FLOWS AND DAILY FLOWS(CMS)

TRIBUTARY	MONTH	YEAR	MEAN FLOW	DAY	FLOW	DAY	FLOW	DAY	FLOW
1748A1	6	73	23.28	3	8.10				
	7	73	8.50	7	5.10				
	8	73	5.21	26	1.90				
	9	73	0.82	9	1.16				
	10	73	0.71	13	2.29				
	11	73	1.30	3	0.65				
	12	73	10.19	1	3.03				
	1	74	24.13	6	6.97				
	2	74	16.62	3	13.25	17	5.13		
	3	74	15.32	2	12.80	17	18.29		
	4	74	14.07	7	11.50				
	5	74	25.26	5	4.25				
1748A2	6	73	22.26	3	7.99				
	7	73	8.21	7	5.07				
	8	73	5.24	26	2.12				
	9	73	1.13	9	1.44				
	10	73	0.99	13	2.49				
	11	73	1.56	3	0.93				
	12	73	9.91	1	3.17				
	1	74	23.05	6	6.88				
	2	74	16.00	3	12.83	17	5.15		
	3	74	14.72	2	12.37	17	17.53		
	4	74	13.59	7	11.16				
	5	74	24.10	5	4.28				

TRIBUTARY FLOW INFORMATION FOR ILLINOIS 10/23/75

LAKE CODE 1748 LAKE VERMILION

MEAN MONTHLY FLOWS AND DAILY FLOWS(CMS)

TRIBUTARY	MONTH	YEAR	MEAN FLOW	DAY	FLOW	DAY	FLOW	DAY	FLOW
1748A3	6	73	3.06	3	1.10				
	7	73	1.10	7	0.68				
	8	73	0.68	26	0.27				
	9	73	0.14	9	0.18				
	10	73	0.11	13	0.28				
	11	73	0.19	3	0.11				
	12	73	1.22	1	0.40				
	1	74	2.94	6	0.88				
	2	74	2.24	3	1.78	17	0.71		
	3	74	1.98	2	1.64	17	2.35		
	4	74	1.81	7	1.47				
	5	74	3.20	5	0.57				
1748B1	6	73	0.42	3	0.15				
	7	73	0.15	7	0.09				
	8	73	0.09	26	0.04				
	9	73	0.02	9	0.02				
	10	73	0.01	13	0.03				
	11	73	0.03	3	0.02				
	12	73	0.15	1	0.05				
	1	74	0.37	6	0.11				
	2	74	0.31	3	0.25	17	0.10		
	3	74	0.27	2	0.23	17	0.31		
	4	74	0.25	7	0.20				
	5	74	0.42	5	0.08				
1748C1	6	73	0.76	3	0.27				
	7	73	0.27	7	0.16				
	8	73	0.16	26	0.07				
	9	73	0.03	9	0.04				
	10	73	0.03	13	0.11				
	11	73	0.04	3	0.03				
	12	73	0.28	1	0.09				
	1	74	0.71	6	0.21				
	2	74	0.57	3	0.45	17	0.18		
	3	74	0.48	2	0.40	17	0.57		
	4	74	0.45	7	0.37				
	5	74	0.76	5	0.14				
1748D1	6	73	0.68	3	0.25				
	7	73	0.24	7	0.15				
	8	73	0.15	26	0.06				
	9	73	0.03	9	0.03				
	10	73	0.02	13	0.10				
	11	73	0.04	3	0.02				
	12	73	0.24	1	0.08				
	1	74	0.62	6	0.19				
	2	74	0.51	3	0.40	17	0.16		
	3	74	0.45	2	0.37	17	0.51		
	4	74	0.40	7	0.34				
	5	74	0.71	5	0.12				

TRIBUTARY FLOW INFORMATION FOR ILLINOIS 10/23/75

LAKE CODE 1748 LAKE VERMILION

MEAN MONTHLY FLOWS AND DAILY FLOWS(CMS)

TRIBUTARY	MONTH	YEAR	MEAN FLOW	DAY	FLOW	DAY	FLOW	DAY	FLOW
1748E1	6	73	0.91	3	0.31				
	7	73	0.31	7	0.20				
	8	73	0.19	26	0.08				
	9	73	0.04	9	0.05				
	10	73	0.03	13	0.13				
	11	73	0.05	3	0.03				
	12	73	0.34	1	0.11				
	1	74	0.85	6	0.25				
	2	74	0.68	3	0.54	17	0.22		
	3	74	0.57	2	0.48	17	0.68		
	4	74	0.54	7	0.42				
	5	74	0.93	5	0.17				
1748F1	6	73	1.44	3	0.51				
	7	73	0.51	7	0.31				
	8	73	0.31	26	0.12				
	9	73	0.06	9	0.08				
	10	73	0.05	13	0.21				
	11	73	0.08	3	0.05				
	12	73	0.57	1	0.18				
	1	74	1.33	6	0.40				
	2	74	1.05	3	0.85	17	0.34		
	3	74	0.91	2	0.76	17	1.10		
	4	74	0.85	7	0.68				
	5	74	1.47	5	0.26				
1748G1	6	73	10.59	3	3.79				
	7	73	0.37	7	0.23				
	8	73	0.23	26	0.09				
	9	73	0.05	9	0.06				
	10	73	0.03	13	0.15				
	11	73	0.06	3	0.04				
	12	73	0.40	1	0.13				
	1	74	0.99	6	0.28				
	2	74	0.76	3	0.62	17	0.25		
	3	74	0.68	2	0.57	17	0.79		
	4	74	0.62	7	0.51				
	5	74	1.39	5	0.25				
1748ZZ	6	73	1.02	3	0.11				
	7	73	0.68	7	0.42				
	8	73	0.28	26	0.14				
	9	73	0.06	9	0.08				
	10	73	0.08	13	0.17				
	11	73	0.08	3	0.05				
	12	73	0.51	1	0.16				
	1	74	1.25	6	0.37				
	2	74	0.96	3	0.76	17	0.31		
	3	74	0.91	2	0.76	17	1.08		
	4	74	0.82	7	0.68				
	5	74	1.47	5	0.28				

28A

APPENDIX D

PHYSICAL and CHEMICAL DATA

STORET RETRIEVAL DATE 75/10/23

174801
40 09 24.0 087 39 03.0
VERMILION LAKE
17183 ILLINOIS

30A

11EPALES
3

2111202
0018 FEET DEPTH

DATE FROM TO	TIME OF DAY	DEPTH FEET	00010 WATER TEMP CENT	00300 DO MG/L	00077 TRANSP SECCHI INCHES	00094 CNDUCTVY FIELD MICROMHO	00400 PH SU	00410 T ALK CACO3 MG/L	00610 NH3-N TOTAL MG/L	00625 TOT KJEL N MG/L	00630 NO2&NO3 N-TOTAL MG/L	00671 PHOS-DIS ORTHO MG/L P
73/05/11	11 00	0000	17.5		33	600	8.10	210	0.040	0.500	7.500	0.040
	11 00	0005	17.4	9.7		600	8.30	200	0.030	0.400	7.250	0.046
	11 00	0015	16.6	8.0		625	8.20	220	0.070	0.500	7.680	0.054
73/08/08	10 00	0000	25.3		26	524	8.30	197	0.090	1.800	4.500	0.008
	10 00	0005	25.0	6.5		533	7.90	203	0.120	1.100	4.540	0.021
	10 00	0014	23.4	0.8		526	7.60	230	0.110	1.000	4.620	0.064
73/10/17	15 25	0000	18.6		18	460	8.00	238	0.140	1.400	1.380	0.060
	15 25	0005	18.5	5.8		462	8.20	218	0.050	0.500	1.110	0.047
	15 25	0012	18.4	6.0		460	8.00	210	0.090	0.600	1.120	0.057

DATE FROM TO	TIME OF DAY	DEPTH FEET	00665 PHOS-TOT MG/L P	32217 CHLRPHYL A UG/L
73/05/11	11 00	0000	0.068	5.3
	11 00	0005	0.072	
	11 00	0015	0.097	
73/08/08	10 00	0000	0.069	18.7
	10 00	0005	0.090	
	10 00	0014	0.138	
73/10/17	15 25	0000	0.120	18.8
	15 25	0005	0.121	
	15 25	0012	0.111	

STORET RETRIEVAL DATE 75/10/23

174802
40 10 30.0 087 38 33.0
VERMILION LAKE
17183 ILLINOIS

11EPALES 2111202
3 0005 FEET DEPTH

DATE FROM TO	TIME OF DAY	DEPTH FEET	00010 WATER TEMP CENT	00300 DO MG/L	00077 TRANSP SECCHI INCHES	00094 CNDUCTVY FIELD MICROMHO	00400 PH SU	00410 T ALK CACO3 MG/L	00610 NH3-N TOTAL MG/L	00625 TOT KJEL N MG/L	00630 NO2&NO3 N-TOTAL MG/L	00671 PHOS-DIS ORTHO MG/L P
73/05/11	10	25 0000	17.8	8.3	17	650	8.20	220	0.110	0.800	7.620	0.066
	10	25 0003	17.3	9.0		640	8.20	220	0.090	0.400	7.660	0.062
73/08/08	10	20 0000		8.8	7		8.30	235	0.100	1.900	4.040	0.032
73/10/17	15	20 0000	17.8		10	475						

DATE FROM TO	TIME OF DAY	DEPTH FEET	00665 PHOS-TOT MG/L P	32217 CHLRPHYL A UG/L
73/05/11	10	25 0000	0.123	12.6
	10	25 0003	0.108	
73/08/08	10	20 0000	0.223	96.3
73/10/17	15	20 0000		35.2

APPENDIX E

TRIBUTARY DATA

STORET RETRIEVAL DATE 75/10/23

1748A1
40 08 12.0 087 39 16.0
N FORK VERMILION RIVER
17167 7.5 NW DANVILLE
0/LAKE VERMILION
RD BRDG 1.5 MI DOWNSTREAM FROM DAM
11EPALES 2111204
4 0000 FEET DEPTH

DATE FROM TO	TIME OF DAY	DEPTH FEET	00630 NO2&NO3 N-TOTAL MG/L	00625 TOT KJEL N MG/L	00610 NH3-N TOTAL MG/L	00671 PHOS-DIS ORTHO MG/L P	00665 PHOS-TOT MG/L P
73/06/03	08 27		7.000	0.580	0.098	0.039	0.105
73/07/07	13 00		6.500	0.100K	0.050	0.023	0.095
73/08/26	10 30		2.200	0.830	0.061	0.052	0.090
73/09/09	13 35		1.200	1.200	0.041	0.020	0.150
73/10/13	10 10		1.060	0.920	0.044	0.042	0.135
73/11/03	15 45		1.020	1.150	0.075	0.041	0.230
73/12/01	14 40		1.260	0.600	0.060	0.076	0.115
74/01/06	10 46		8.900	1.100	0.116	0.056	0.075
74/02/03	10 35		8.300	0.400	0.065	0.050	0.085
74/02/17	10 20		7.400	1.700	0.090	0.015	
74/03/02	14 45		7.980	1.500	0.070	0.055	0.110
74/03/17	10 20		7.440	0.600	0.060	0.050	0.100
74/04/07	10 50		7.300	1.100	0.040	0.055	0.110
74/05/05	10 15		6.400	0.700	0.045	0.045	0.115

K VALUE KNOWN TO BE
LESS THAN INDICATED

STORET RETRIEVAL DATE 75/10/23

1748A2
40 12 58.0 087 38 18.0
N FORK VERMILION RIVER
17 7.5 NW DANVILLE
I/LAKE VERMILION
ST HWY 136 BRDG 4 MI N OF DANVILLE
11EPALES 2111204
4 0000 FEET DEPTH

DATE FROM TO	TIME OF DAY	DEPTH FEET	00630 NO2&NO3 N-TOTAL MG/L	00625 TOT KJEL N MG/L	00610 NH3-N TOTAL MG/L	00671 PHOS-DIS ORTHO MG/L P	00665 PHOS-TOT MG/L P
73/06/03	10 55		8.500	0.170	0.072	0.090	0.165
73/07/07	11 35		7.150	0.660	0.016	0.105	0.163
73/08/26	10 15		2.600	0.230	0.034	0.154	0.170
73/09/09	12 40		1.440	1.150	0.210	0.280	0.330
73/10/13	09 55		2.020	1.000	0.069	0.280	0.345
73/11/03	15 15		1.840	0.400	0.052	0.290	0.360
73/12/01	14 20		6.100	0.100K	0.044	0.096	0.110
74/02/03	10 20		8.300	0.400	0.090	0.065	0.100
74/02/17	10 05		7.500	0.900	0.070	0.050	0.062
74/03/02	14 30		8.100	0.700	0.040	0.040	0.079
74/03/17	10 00		8.600	1.100	0.045	0.035	0.095
74/04/07	10 35		8.700	1.000	0.027	0.045	0.143
74/05/05	10 00		6.600	0.500	0.020	0.055	0.100

K VALUE KNOWN TO BE
LESS THAN INDICATED

STORET RETRIEVAL DATE 75/10/23

1748A3
40 29 25.0 087 34 04.0
N FK VERMILION RIVER
17 7.5 AMBIA
T/LAKE VERMILION
2NDRY RD BRDG 2.[illegible] MI W OF AMBIA
11EPALES 2111204
4 0000 FEET DEPTH

35A

DATE FROM TO	TIME OF DAY	DEPTH FEET	00630 NO2&NO3 N-TOTAL MG/L	00625 TOT KJEL N MG/L	00610 NH3-N TOTAL MG/L	00671 PHOS-DIS ORTHO MG/L P	00665 PHOS-TOT MG/L P
73/07/07	11 35		6.900	0.100K	0.046	0.028	0.060
73/08/26	09 05			0.340	0.078	0.042	0.075
73/09/09	10 45		1.600	1.500	0.044	0.027	0.080
73/10/13	09 00		1.000	1.680	0.118	0.042	0.270
73/11/03	10 30		1.160	1.250	0.072	0.054	0.250
73/12/01	11 15		6.900	0.400	0.024	0.030	0.185
74/01/06	09 30		9.750	0.700	0.044	0.020	0.025
74/02/03	09 30		9.200	0.600	0.080	0.020	0.055
74/02/17	09 05		8.900	0.900	0.045	0.015	0.030
74/03/02	10 30		9.500	0.800	0.020	0.015	0.040
74/03/17	09 00		10.050	0.800	0.030	0.010	0.025
74/04/07	09 15		10.000	1.000	0.020	0.020	0.060
74/05/05	09 10		8.600	0.500	0.030	0.022	0.040

K VALUE KNOWN TO BE
LESS THAN INDICATED

STORET RETRIEVAL DATE 75/10/23

174881
40 15 55.0 087 38 40.0
UNNAMED CREEK
17 7.5 HENNING
T/LAKE VERMILION
?NDRY RD BRDG 0.4 MI E OF MOORES CORNER
11EPALES 2111204
4 0000 FEET DEPTH

DATE FROM TO	TIME OF DAY	DEPTH FEET	00630 NO2&NO3 N-TOTAL MG/L	00625 TOT KJEL N MG/L	00610 NH3-N TOTAL MG/L	00671 PHOS-DIS ORTHO MG/L P	00665 PHOS-TOT MG/L P
73/06/03	10 40		10.100	0.720	0.040	0.035	0.090
73/07/07	12 30		9.300	0.100K	0.020	0.025	0.050
73/08/26	09 55		6.400	0.200	0.025	0.019	0.025
73/09/09	12 30		5.700	0.720	0.037	0.021	0.070
73/10/13	09 45		4.600	0.840	0.044	0.029	0.090
73/11/03	14 45		5.200	1.825	0.061	0.048	0.340
73/12/01	14 00		6.900	0.100K	0.012	0.028	0.185
74/01/06	10 15		8.600	0.500	0.016	0.020	0.030
74/02/03	10 15		7.100	0.800	0.035	0.040	0.080
74/02/17	09 55		7.300	0.300	0.020	0.020	0.045
74/03/02	14 00		7.800	0.800	0.010	0.020	0.080
74/03/17	09 50		8.550	0.400	0.013	0.020	0.055
74/04/07	10 25		8.500	0.800	0.025	0.025	0.060
74/05/05	09 50		7.800	0.400	0.015	0.016	0.040

K VALUE KNOWN TO BE
LESS THAN INDICATED

STORET RETRIEVAL DATE 75/10/23

1748C1
40 20 44.0 087 42 10.0
UNNAMED CREEK
17 7.5 HENNING
T/LAKE VERMILION
2NDRY RD BRDG 2.5 MI N OF HENNING
11EPALES 2111204
4 0000 FEET DEPTH

DATE FROM TO	TIME OF DAY	DEPTH FEET	00630 NO2&NO3 N-TOTAL MG/L	00625 TOT KJEL N MG/L	00610 NH3-N TOTAL MG/L	00671 PHOS-DIS ORTHO MG/L P	00665 PHOS-TOT MG/L P
73/06/03	09 20		10.100	1.680	0.040	0.020	0.040
73/07/07	12 10		9.100	0.100K	0.029	0.012	0.035
73/08/26	09 35		5.300	0.880	0.027	0.006	0.120
73/09/09	12 05		2.300	0.560	0.180	0.009	0.025
73/10/13	09 30		2.800	0.660	0.050	0.019	0.080
73/11/03	13 55		3.600	0.950	0.060	0.018	0.190
73/12/01	13 40		8.100	0.100K	0.012	0.024	0.375
74/01/06	10 00		9.000	0.500	0.016	0.012	0.012
74/02/03	10 00		8.300	0.300	0.025	0.025	0.035
74/02/17	09 40		8.100	0.500	0.025	0.010	0.020
74/03/02	13 30		8.400	0.600	0.010	0.015	0.070
74/03/17	09 30		8.750	0.800	0.105	0.010	0.042
74/04/07	10 05		9.000	0.800	0.115	0.015	0.035
74/05/05	09 35		7.900	0.400	0.010	0.017	0.030

K VALUE KNOWN TO BE
LESS THAN INDICATED

STORET RETRIEVAL DATE 75/10/23

174801
40 20 53.0 087 35 52.0
UNNAMED CREEK
17 7.5 BISMARK
T/LAKE VERMILION
2NDRY RD BRDG 2.5 MI NNE OF ALVIN
11EPALES 2111204
4 0000 FEET DEPTH

DATE FROM TO	TIME OF DAY	DEPTH FEET	00630 NO2&NO3 N-TOTAL MG/L	00625 TOT KJEL N MG/L	00610 NH3-N TOTAL MG/L	00671 PHOS-DIS ORTHO MG/L P	00665 PHOS-TOT MG/L P
73/06/03	10 15		9.300	3.490	0.110	0.069	0.300
73/07/07	11 00		8.900	3.300	0.094	0.120	0.630
73/08/26	08 30		2.100	8.200	0.305	0.157	1.550
73/09/09	10 00		0.460	1.470	0.420	0.126	0.855
73/10/13	08 30		1.200	8.750	1.000	2.000	2.900
73/11/03	09 30		0.760	2.100	0.450	0.105	0.390
73/12/01	10 15		5.500	0.600	0.044	0.192	0.280
74/01/06	08 55		10.000	0.500	0.014	0.012	0.020
74/02/03	08 55		9.100	0.500	0.025	0.035	0.085
74/02/17	08 30		9.400	0.300	0.010	0.010	0.025
74/03/02	09 50		10.000	0.700	0.070	0.015	0.040
74/03/17	08 30		10.820	1.000	0.065	0.030	0.080
74/04/07	08 40		9.500	1.200	0.025	0.035	0.230
74/05/05	08 40		9.400	0.900	0.135	0.010	0.045

STORET RETRIEVAL DATE 75/10/23

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1748E1
40 23 41.0 087 34 43.0
UNNAMED CREEK
17 7.5 AMBIA
T/LAKE VERMILION
2NDRY RD BRDG 0.6 MI E OF COLLEGE CORNER
11EPALES 2111204
4 0000 FEET DEPTH

DATE FROM TO	TIME OF DAY	DEPTH FEET	00630 NO2&NO3 N-TOTAL MG/L	00625 TOT KJEL N MG/L	00610 NH3-N TOTAL MG/L	00671 PHOS-DIS ORTHO MG/L P	00665 PHOS-TOT MG/L P
73/06/03	10 00		12.000	3.100	0.094	0.048	0.060
73/07/07	11 15		8.400	0.100K	0.014	0.011	0.020
73/08/26	08 48		2.200	0.560	0.086	0.014	0.045
73/09/09	10 25		1.320	1.260	0.230	0.020	0.045
73/10/13	08 42		2.500	1.000	0.084	0.034	0.060
73/11/03	10 00		3.400	5.800	0.084	0.027	1.550
73/12/01	10 45		8.000	0.100K	0.012	0.024	0.180
74/01/06	09 15		10.400	0.250	0.012	0.008	0.015
74/02/03	09 05		9.800	0.400	0.025	0.015	0.030
74/02/17	08 50		9.100	0.100	0.010	0.010	0.020
74/03/02	10 10		9.900	0.500	0.025	0.010	0.030
74/03/17	08 45		11.800	0.600	0.035	0.010	0.025
74/04/07	09 55		11.200	0.500	0.025	0.020	0.035
74/05/05	08 55		9.100	0.400	0.020	0.016	0.025

K VALUE KNOWN TO BE
LESS THAN INDICATED

STORET RETRIEVAL DATE 75/10/23

1748F1
40 23 41.0 087 34 25.0
MIDDLE BRANCH
17 7.5 AMBIA
T/LAKE VERMILION
2NDRY RD BRDG 0.9 MI E OF COLLEGE CORNER
11EPALES 2111204
4 0000 FEET DEPTH

DATE FROM TO	TIME OF DAY	DEPTH FEET	00630 NO2&NO3 N-TOTAL MG/L	00625 TOT KJEL N MG/L	00610 NH3-N TOTAL MG/L	00671 PHOS-DIS ORTHO MG/L P	00665 PHOS-TOT MG/L P
73/06/03	10	10	10.000	0.110	0.038	0.016	0.030
73/07/07	11	10	8.400	0.350	0.025	0.009	0.030
73/08/26	08	45	1.620	0.480	0.063	0.007	0.040
73/09/09	10	20	0.460	1.380	0.110	0.012	0.050
73/10/13	08	40	1.700	1.750	0.078	0.048	0.110
73/11/03	09	50	1.820	0.950	0.082	0.020	0.300
73/12/01	10	35	7.300	0.100K	0.032	0.020	0.185
74/01/06	09	10	11.200	0.400	0.012	0.012	0.020
74/02/03	09	10	10.600	0.800	0.080	0.035	0.085
74/02/17			9.900	1.700	0.060	0.010	0.020
74/03/02	10	05	10.900	1.200	0.020	0.010	0.045
74/03/17	08	40	11.200	0.400	0.015	0.010	0.035
74/04/07	09	50	11.200	1.000	0.020	0.025	0.080
74/05/05	08	50	9.800	0.800	0.090	0.010	0.035

K VALUE KNOWN TO BE
LESS THAN INDICATED

STORET RETRIEVAL DATE 75/10/23

1748G1
40 25 35.0 087 41 07.0
UNNAMED STREAM
17 7.5 HOOPESTON
T/LAKE VERMILION
ST RD #1 BRDG 2.5 MI SW OF HOOPESTON
11EPALES 2111204
4 0000 FEET DEPTH

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DATE FROM TO	TIME OF DAY	DEPTH FEET	00630 NO2&NO3 N-TOTAL MG/L	00625 TOT KJEL N MG/L	00610 NH3-N TOTAL MG/L	00671 PHOS-DIS ORTHO MG/L P	00665 PHOS-TOT MG/L P
73/06/03	09 35		9.800	0.560	0.066	0.014	0.030
73/07/07	12 00		8.000	0.690	0.032	0.011	0.050
73/08/26	09 20		3.600	0.140	0.036	0.006	0.030
73/09/09	11 45			1.100	0.030	0.007	0.030
73/10/13	09 15		3.200	1.340	0.052	0.024	0.115
73/11/03	13 30		4.500	0.350	0.020	0.015	0.150
73/12/01	13 05		7.980	0.100K	0.012	0.020	0.180
74/01/06	09 45		8.400		0.012	0.012	
74/02/03	09 45		7.800	1.000	0.070	0.015	0.045
74/02/17	09 30		7.300	2.100	0.080	0.010	0.050
74/03/02	13 00		8.400	0.700	0.010	0.010	0.050
74/03/17	09 20		8.150	1.000	0.015	0.025	0.105
74/04/07	08 55		8.500	0.700	0.020	0.015	0.015
74/05/05	09 25		7.100	0.700	0.150	0.005K	0.020

K VALUE KNOWN TO BE
LESS THAN INDICATED